

REMARKS

Please reconsider this application in view of the above amendments and the following remarks. Applicant thanks the Examiner for carefully considering this application and for indicating that the drawings filed on November 14, 2003 are accepted.

Disposition of Claims

Claims 1-41 were pending. Claims 2-6, 16, 23, 33, and 37-41 are hereby cancelled without prejudice or disclaimer. Accordingly, claims 1, 7-15, 17-22, 24-32, and 34-36 remain pending. Claims 1, 22, and 36 are independent. The remaining claims depend, directly or indirectly, from independent claims 1 and 22.

Amendments to the Specification

Per the Examiner's request, Table 1 of the specification is hereby amended to use 1.5 line spacing. *See* Office Action dated January 12, 2007, p. 2. No new matter is added by way of this amendment, as the amendment is merely a formality to increase the line spacing in the table.

Amendments to the Claims

Claims 1, 10-15, 17-22, 24-32, and 34-36 are hereby amended to clarify aspects of the claimed invention. No new matter is added by way of these amendments, as support can

be found, for example, in Figure 3 and paragraphs [0014]-[0017] and [0022]-[0030] of the specification as filed.

Further, claims 10, 27-32, and 34-35 are hereby amended to correct typographical errors. No new matter is added by way of these amendments, as the amendments are merely a formality to correct typographical errors.

Further, claims 15 , 17 -19, 27-32, and 34-35 are hereby amended to address antecedent basis issues. No new matter is added by way of these amendments, as the amendments are merely a formality to address antecedent basis issues.

Further, in view of the aforementioned cancellation of claim 2, claims 10-14 are hereby amended to depend from amended independent claim 1. No new matter is added by way of these amendments, as the amendments are merely a formality to maintain proper dependencies in the claims.

Amendments to the Abstract

The abstract is hereby amended for consistency with the amended claims. No new matter is added by way of these amendments, as support may be found in the specification as described above.

Claim Objections

The Examiner has objected to claim 10 as containing informalities. *See* Office Action dated January 12, 2007 at p. 2. As noted above, claim 10 has been amended to clarify aspects of the claimed invention and to correct typographical errors. Accordingly, Applicant submits that claim 10 no longer contains informalities, and withdrawal of this objection is respectfully requested.

Rejections under 35 U.S.C. § 101

As an initial matter, Applicant respectfully notes that the Examiner has stated that claim 19 lacks a practical application, but has not explicitly rejected claim 19 under 35 U.S.C. § 101. *See* Office Action dated January 12, 2007. at pp. 2-3. In the interest of advancing prosecution of the application, Applicant hereby assumes that the omission of claim 19 from the rejection is merely a typographical error, and is arguing for allowance of claim 19 accordingly.

Turning to the rejection of the claims, claims 1-2, 6-9, 19, and 22-35 stand rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter. As noted above, claims 2, 6, 23, and 33 have been cancelled without prejudice or disclaimer. Accordingly, the rejection is now moot with respect to claims 2, 6, 23, and 33. To the extent that the rejection may still apply to the amended claims, the rejection is respectfully traversed.

Regarding claims 1, 7-9, and 19, the Examiner has stated that the claims fail to produce a useful, concrete and tangible result. *Id.* at pp. 2-3. As noted above, independent claim 1 has been amended to clarify aspects of the claimed invention. In particular, amended independent claim 1 recites, in part, “evaluating safety of a tracing program” and “reporting an

error condition and aborting virtual machine emulation of an unsafe instruction in the plurality of instructions when the at least one safety check detects the unsafe instruction.” Evaluating safety of a tracing program is clearly a practical application. Further, reporting an error condition is clearly a concrete and tangible result. Thus, Applicant submits that amended independent claim 1 is directed to statutory subject matter. Claims 7-9 and 19 depend, directly or indirectly, from amended independent claim 1 and are therefore also directed to statutory subject matter. Accordingly, withdrawal of this rejection is respectfully requested.

Regarding claims 22, 24-32, and 34-35, the Examiner has suggested that the claimed “mechanism” is merely a data structure and is therefore merely “nonfunctional descriptive material.” *Id.* at p. 3. As noted above, claims 22, 24-32, and 34-35 have been amended to clarify aspects of the claimed invention. In particular, the amended claims are directed to a “tracing framework,” rather than a “mechanism.” Further, amended independent claim 22 clearly recites “an instruction validator” and “a safety check facility” configured to perform various functions. These elements are clearly *functional* elements of the tracing framework, and as such cannot possibly constitute mere data structures. Moreover, amended independent claim 22 includes at least the same statutory limitations as amended independent claim 1 described above. Claims 24-32 and 34-35 depend, directly or indirectly, from amended independent claim 22, and therefore include at least the same statutory subject matter. Thus, Applicant submits that claims 22, 24-32, and 34-35 are directed to statutory subject matter, and withdrawal of this rejection is respectfully requested.

Rejections under 35 U.S.C. § 112

Claims 1-2, 6-9, and 21 stand rejected under 35 U.S.C. § 112 ¶ 2 as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. As noted above, claims 2 and 6 have been cancelled without prejudice or disclaimer. Accordingly, the rejection is moot with respect to claims 2 and 6. To the extent that the rejection may still apply to the amended claims, the rejection is respectfully traversed.

Regarding claims 1 and 7-9, the Examiner has stated that the claims do not satisfy the intended function as stated in the preamble. *Id.* at p. 4. As noted above, amended independent claim 1 recites, in part, “evaluating safety of a tracing program” and “reporting an error condition and aborting virtual machine emulation of an unsafe instruction in the plurality of instructions when the at least one safety check detects the unsafe instruction.” Thus, Applicant submits that amended independent claim 1 clearly satisfies the intended function recited in the preamble and is not indefinite. Claims 7-9 depend, directly or indirectly, from amended independent claim 1 and therefore are also not indefinite. Accordingly, withdrawal of this rejection is respectfully requested.

Regarding claim 21, the Examiner has indicated that the claim is inconsistent and at odds with paragraph [0030] of the specification. *Id.* at p. 4. As noted above, claim 21 has been amended to clarify aspects of the claimed invention. Accordingly, Applicant submits that the claim is not inconsistent or at odds with the specification, and withdrawal of this rejection is respectfully requested.

Rejections under 35 U.S.C. § 103

As an initial matter, Applicant notes that although the Examiner did not list claims 36-41 in the list of rejected claims on page 5 in the Office Action, claims 36-41 are addressed on page 9 of the Office Action. Thus, Applicant assumes that the omission of claims 36-41 in the list of rejected claims is merely a typographical error and is arguing for allowance of the claims accordingly.

As noted above, claims 1, 10-15, 17-22, 24-32, and 34-36 have been amended to clarify aspects of the claimed invention. Specifically, the claimed invention is directed to validation and safety checks performed on *each* instruction contained in byte code. The validation and safety checks are performed during a virtual machine emulation of the instructions. When an unsafe instruction is detected, virtual machine emulation of that particular instruction is aborted, and an error condition is reported. The virtual machine emulation then continues with the next instruction in the byte code. When a safe instruction is encountered, virtual machine emulation of that particular instruction is completed. Thus, the claimed invention allows for the safety of *each* instruction to be evaluated, even *after* an unsafe instruction is detected. *See, e.g.*, Specification as filed at [0021]-[0023].

Turning to the rejections of the claims, to establish a *prima facie* case of obviousness, “[f]irst, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.” MPEP § 2143. Further, “all words in a claim must be considered in judging the patentability of that claim against the prior art.” MPEP § 2143.03.

Claims 1-6, 8-11, 13-14, 19, 22-23, 25-28, 30-31, and 36-41

Claims 1-6, 8-11, 13-14, 19, 22-23, 25-28, 30-31, and 36-41 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,668,999 (“Gosling”) in view of U.S. Patent No. 6,581,206 (“Chen”) and U.S. Patent No. 6,026,237 (“Berry”). As noted above, claims 2-6, 23, and 37-41 have been cancelled without prejudice or disclaimer. Accordingly, the rejection is moot with respect to claims 2-6, 23, and 37-41. To the extent that the rejection may still apply to the amended claims, the rejection is respectfully traversed. Specifically, Applicant respectfully asserts that the references, when combined, fail to teach or suggest all the limitations of claims 1, 8-11, 13-14, 19, 22, 25-28, 30-31, and 36.

Amended independent claim 1 recites, in part:

reporting an error condition and **aborting virtual machine emulation of an unsafe instruction** in the plurality of instructions when the at least one safety check detects the unsafe instruction; and **completing virtual machine emulation of a safe instruction in the plurality of instructions** when the at least one safety check detects the safe instruction, **after aborting virtual machine emulation of the unsafe instruction.**

Amended independent claims 22 and 36 include substantially similar limitations. Thus, the amended claims clearly require aborting virtual machine emulation of an unsafe instruction and completing virtual machine emulation of a safe instruction. More specifically, the amended claims require *completing* virtual machine emulation of the safe instruction *after aborting* virtual machine emulation of the unsafe instruction.

The Examiner has asserted that Gosling teaches aborting the virtual machine emulation if an unsafe instruction is detected and completing the virtual machine emulation if a safe instruction is detected. *Id.* at p. 7. However, assuming *arguendo* that Gosling’s verification

process using a “virtual stack” is equivalent to the “virtual machine emulation” recited in the claims, Gosling does not teach or suggest aborting verification of *individual instructions*. To the contrary, in Gosling, whenever the verifier encounters an invalid instruction, *the entire verification process* is aborted. *See, e.g.*, Gosling, col. 8, lines 25-28 and 50-52; col. 9, lines 4-6; and col. 10, lines 11-13, 25-27, and 44-46. Thus, Gosling could never encounter – or much less verify – a safe instruction *after* aborting the verification process. Clearly, Gosling cannot possibly describe “*completing virtual machine emulation of a safe instruction in the plurality of instructions... after aborting virtual machine emulation of the unsafe instruction,*” as required by the amended claims.

In view of the above, Gosling clearly does not teach or suggest all the limitations of amended independent claims 1, 22, and 36. Chen and Berry are both completely silent with respect to virtual machine emulation of any sort, and as such cannot possibly supply that which Gosling lacks. Thus, amended independent claims 1, 22, and 36 are patentable over Gosling, Chen and Berry for at least the reasons given above. Claims 8-11, 13-14, 19, 25-28, and 30-31 depend, directly or indirectly, from amended independent claims 1 and 22, and are therefore patentable over Gosling, Chen and Berry for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Claims 7 and 24

Claims 7 and 24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Gosling, in view of Chen and Berry, and further in view of “Compilers: Principles,

Techniques, and Tools” (“Aho”). To the extent that this rejection may still apply to the amended claims, the rejection is respectfully traversed.

As discussed above, Gosling, Chen and Berry do not teach or suggest all the limitations of amended independent claims 1 and 22. Aho fails to supply that which Gosling, Chen and Berry lack, as evidenced by the fact that the Examiner has relied on Aho solely to teach the additional limitations of claims 7 and 24. *See* Office Action dated January 12, 2007 at pp. 9-10.

In view of the above, Gosling, Chen, Berry, and Aho do not teach or suggest all the limitations of amended independent claims 1 and 22. Thus, amended independent claims 1 and 22 are patentable over Gosling, Chen, Berry, and Aho for at least the reasons given above. Claims 7 and 24 depend, directly or indirectly, from amended independent claims 1 and 22, and are therefore patentable over Gosling, Chen, Berry, and Aho for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Claims 12, 21, and 29

Claims 12, 21, and 29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Gosling, in view of Chen and Berry, and further in view of “Java Bytecode Verification: Algorithms and Formalization” (“Leroy”). To the extent that this rejection may still apply to the amended claims, the rejection is respectfully traversed.

As discussed above, Gosling, Chen and Berry do not teach or suggest all the limitations of amended independent claims 1 and 22. Leroy fails to supply that which Gosling, Chen and Berry lack, as evidenced by the fact that the Examiner has relied on Leroy solely to

teach the additional limitations of claims 12, 21, and 29. *See* Office Action dated January 12, 2007 at pp. 10-11.

In view of the above, Gosling, Chen, Berry, and Leroy do not teach or suggest all the limitations of amended independent claims 1 and 22. Thus, amended independent claims 1 and 22 are patentable over Gosling, Chen, Berry, and Leroy for at least the reasons given above. Claims 12, 21, and 29 depend, directly or indirectly, from amended independent claims 1 and 22, and are therefore patentable over Gosling, Chen, Berry, and Leroy for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Claims 15 and 32

Claims 15 and 32 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Gosling, in view of Chen and Berry, and further in view of U.S. Patent No. 5,432,795 (“Robinson”). To the extent that this rejection may still apply to the amended claims, the rejection is respectfully traversed.

As discussed above, Gosling, Chen and Berry do not teach or suggest all the limitations of amended independent claims 1 and 22. Robinson fails to supply that which Gosling, Chen and Berry lack, as evidenced by the fact that the Examiner has relied on Robinson solely to teach the additional limitations of claims 15 and 32. *See* Office Action dated January 12, 2007 at pp. 11-12.

In view of the above, Gosling, Chen, Berry, and Robinson do not teach or suggest all the limitations of amended independent claims 1 and 22. Thus, amended independent claims 1 and 22 are patentable over Gosling, Chen, Berry, and Robinson for at least the reasons given

above. Claims 15 and 32 depend, directly or indirectly, from amended independent claims 1 and 22, and are therefore patentable over Gosling, Chen, Berry, and Robinson for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Claims 16-18 and 33-35

Claims 16-18 and 33-35 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Gosling, in view of Chen and Berry, and further in view of U.S. Patent No. 6,125,441 ("Green"). As noted above, claims 16 and 33 have been cancelled without prejudice or disclaimer. To the extent that this rejection may still apply to the amended claims, the rejection is respectfully traversed.

As discussed above, Gosling, Chen and Berry do not teach or suggest all the limitations of amended independent claims 1 and 22. Green fails to supply that which Gosling, Chen and Berry lack, as evidenced by the fact that the Examiner has relied on Green solely to teach the additional limitations of claims 16-18 and 33-35. *See* Office Action dated January 12, 2007 at pp. 12-14.

In view of the above, Gosling, Chen, Berry, and Green do not teach or suggest all the limitations of amended independent claims 1 and 22. Thus, amended independent claims 1 and 22 are patentable over Gosling, Chen, Berry, and Green for at least the reasons given above. Claims 17-18 and 34-35 depend, directly or indirectly, from amended independent claims 1 and 22, and are therefore patentable over Gosling, Chen, Berry, and Green for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Claim 20

Claim 20 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Gosling, in view of Chen and Berry, and further in view of U.S. Patent No. 4,713,749 (“Magar”). To the extent that this rejection may still apply to the amended claims, the rejection is respectfully traversed.

As discussed above, Gosling, Chen and Berry do not teach or suggest all the limitations of amended independent claim 1. Magar fails to supply that which Gosling, Chen and Berry lack, as evidenced by the fact that the Examiner has relied on Magar solely to teach the additional limitations of claim 20. *See* Office Action dated January 12, 2007 at p. 14.


In view of the above, Gosling, Chen, Berry, and Magar do not teach or suggest all the limitations of amended independent claim 1. Thus, amended independent claim 1 is patentable over Gosling, Chen, Berry, and Magar for at least the reasons given above. Claim 20 depends, directly or indirectly, from amended independent claim 1, and is therefore patentable over Gosling, Chen, Berry, and Magar for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Conclusion

Applicant believes this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number listed below. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 03226/344001; SUN040244).

Dated: March 15, 2007

Respectfully submitted,

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Attachments: Clean copy of amended Table 1 (3 sheets)
Clean copy of amended abstract (1 sheet)